July - August 1989

FAA Aviation NEWS

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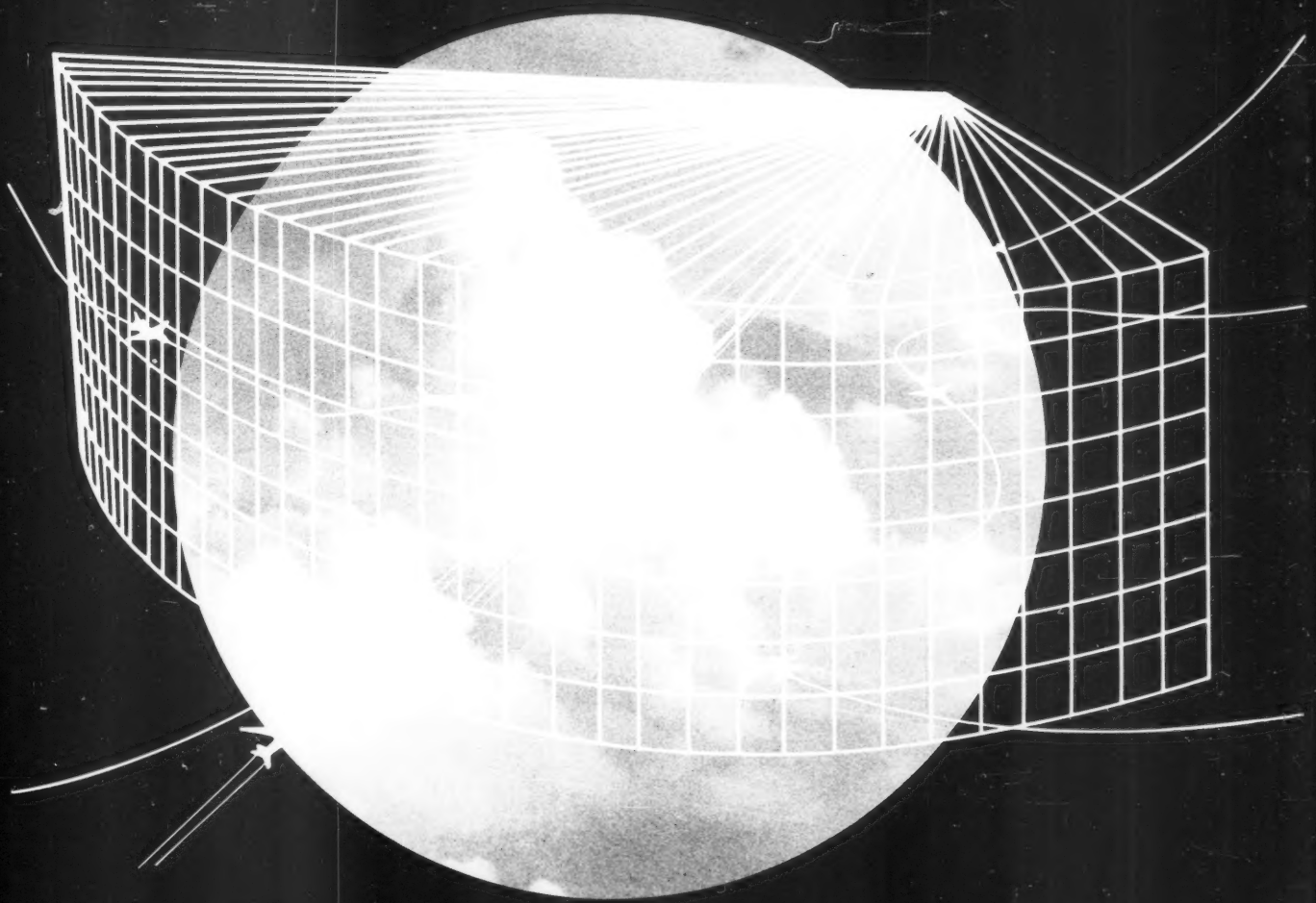

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U.S. Department of Transportation
Federal Aviation Administration

FAA Aviation NEWS

July/August 1989
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BRIEFS

OSHKOSH '89. Top DOT and FAA officials, including Secretary of Transportation Samuel K. Skinner, will lead discussions about FAA services, rules, and safety topics at the 37th Annual Experimental Aircraft Association Fly-In and Sport Convention. The public is invited to attend these seminars at the FAA Aviation Safety Center's 400-seat auditorium in Oshkosh, WI, on July 28 through August 3. Check NOTAMs for the special air traffic procedures.

SEAL ALERT. Over the past few years warnings have been issued concerning the total removal of oil container seals before pouring in new oil. Pieces of the seal have been found in the oil drain, quick oil drain valve, or even the crankcase.

Another problem has surfaced concerning the plastic seal in the oil container cap. Overtightening can cut the seal and possibly allow the center portion of the seal to drop into the container, and be poured unnoticed into the engine. Take the simple precaution of checking for the seal each time you open a screw cap container. If it is not in evidence, take the precaution of using a small strainer when pouring the oil.

EXCESS DRAINAGE. The Canadian Civil Aviation Authority has published reports of aircraft experiencing engine failure following takeoff, as a consequence of a drain valve being inadvertently locked in the open position while the cockpit fuel selector was at OFF position. Care should be taken to assure that all drain cocks used to sample fuel are properly closed thereafter.

LOCAL WEATHER. FAA has awarded a contract for Automated Weather Observing Systems (AWOS) to be produced, installed, and maintained at 160 airports across the country. AWOS will provide critical aviation weather data (including wind, temperature, dew point, altimeter setting, visibility and ceiling) to airports without official weather observation capability. Minute-by-minute weather updates will be broadcast over ground-to-air radio by a computer-generated voice operating 24 hours a day, seven days a week. Installation of the system will get under way shortly and should be completed in 1991.

Storm-Proofing Your Airplane

For reasons best explained by the weatherman, the "good old summertime" is also the time for high winds that play havoc with parked aircraft. While hurricanes and tornadoes are an obvious threat, small sudden local summer storms can also cause great damage to aircraft that are not properly tied down.

The best way to protect your aircraft against expected violent windstorms is to fly it out of the storm area, providing, of course, you are certain that you have sufficient time. Do not risk your life to save your craft—you may lose both. The next best protective measure is to get your aircraft in a storm proof hangar. However, as pilots frequently do not receive any advance warning on local storms, it is a good idea to securely tie down your aircraft after each flight.

Plan ahead. Prepare for the worst windstorm likely to hit your area without warning—say, for gusts of winds ranging over 30 mph and pouring rain with intermittent sheets of water blowing across the runways, ramps and parking areas. When securing your aircraft, it is a good practice to fasten all doors and windows properly to minimize damage inside the craft. Intake and exhaust openings and pitot static tubes for both reciprocating and gas turbine type engines should be covered to prevent damage from wind-blown debris. This also helps keep out birds and insects.

Study your manufacturer's instructions for tying down. These instructions and charts frequently spell out the tiedown procedures necessary for aircraft of different weights when subjected to winds of various velocities.

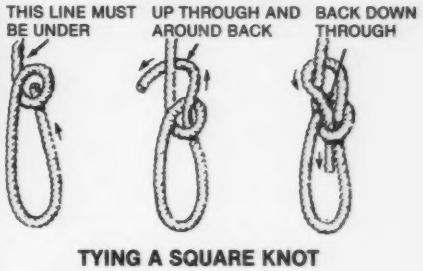
Airplane parking areas should be equipped for three-point tiedowns and spaced far enough apart to allow ample wing clearance. Spacing should be equal to the wing span or fuselage length, whichever is longer, plus 10 feet. Tiedown anchors for single engine aircraft should provide a minimum holding power of approximately 3,000 pounds each. The types of anchors used at airports vary according to whether the parking area is concrete, paved surface, or turf.

The tiedown anchor eyes should not protrude more than an inch above the ground. The location is usually indicated by white or yellow paint, by a painted tire set into the ground or by crushed stone. Do not depend on wooden stakes as tiedown anchors—they may pull out when the ground becomes soaked from the torrential rains that accompany many thunderstorms and hurricanes.

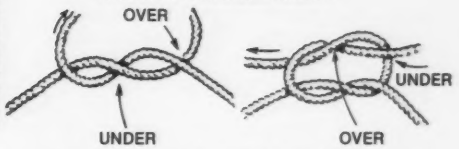
Aircraft should be parked—as nearly as the parking area mooring points permit—heading into the prevailing wind or the forecast wind. After your aircraft is in the proper position, lock the nose wheel or the tail wheel in the fore and aft position.

Like the anchors, tiedown ropes should be capable of resisting a pull of 3,000 pounds. Nylon, dacron, and yellow polypropylene (plastic rope) are all considerably stronger than manila rope, which not only shrinks when wet, but is subject to mildew and rot. An important point to remember is that the strength of the tiedown rope is no better than the knot. Antislip knots, such as a bowline or a square, are quickly tied and easily untied.

TYING A BOWLINE



TYING A SQUARE KNOT



Know the location of the tiedown rings and any special instructions for securing your type of aircraft. Tie the aircraft only at the tiedown rings provided for that purpose. If your plane does not have tiedown rings, have them installed now—before you need them.

In an emergency situation with a storm threatening, if your plane is without tiedown rings and has wing struts, a last resort method might be to fasten the rope to the outer end of the strut, where the strut is connected to the wing, in a manner which will keep it in place. Never tie to the strut itself. If the rope slips down, even a slight pressure may cause the strut to bend. Allow about one inch slack in the rope—more if using a manila rope which may shrink. If there is too much slack, the aircraft may be damaged by jerking against the rope. If tied too tight, the rope may put inverted flight stresses on the aircraft.

Another method for tying down aircraft is to run a continuous length of wire rope along the ground parallel to the wings of parked aircraft. Chains are used to connect the wire rope to the tiedown rings.

All flight controls should be locked or

(continued on back cover)

Microwaved Landing Signals

How and When MLS Will Replace the ILS Landing Signal

This year marks the beginning of a decade-long installation program that will replace the traditional Instrument Landing System (ILS) with the long heralded Microwave Landing System (MLS). This changeover will take place at airports throughout the world, as well as in the United States.

The 40 year old ILS has greatly benefitted the aviation industry by making possible scheduled and dependable flight operations at more than 750 U.S. airports. However the limitations of ILS, as regards flexibility of signal, have long been recognized as a stumbling block to the continuing expansion of air transportation. The state of the art of automatic control and display systems has advanced to a point where landing visibility minimums could be drastically reduced—to zero-zero conditions at many airports—with the aid of an improved form of guidance signal. Furthermore, the cost of installing or improving ILS at sites where signal accuracy is difficult to assure is prohibitive.

After many years of research and world wide consideration of future aviation needs, the International Civil Aviation Organization (ICAO) adopted MLS as the international landing system for general use beginning in the year 1998. In the United States the first federally procured MLS for civil use was commissioned at Lebanon, NH in April of this year. Other installations will follow in accordance with a procurement schedule that will provide MLS equipment at a total of over 1,200 runways through the year 2000.

How will this program affect aircraft users in this country?

No mandatory equipment changes are anticipated for about ten years, since it is expected to take this long to duplicate ILS with MLS at existing locations. ILS and MLS can co-exist and co-function at many airports, without signal interference. Eventually the ILS network will be fully duplicated by MLS, and deactivation of the former system will begin (following a suitable grace period of several years to allow aircraft owners to convert their IFR equipment to MLS).

VFR pilots will not be affected.

How does MLS work?

MLS operates on the same basic principle as ILS, in that the system provides a horizontal (or azimuth) signal and a glide angle (or elevation) signal, which are converted to a display in the cockpit and establish a flight path for the landing approach. However, there is a fundamental difference in the kind of signal propagated by MLS that provides distinct advantages over ILS.

For example:

The frequencies used for ILS are in the VHF/UHF range (108-112 MHz and 329-335 MHz). When this system was devised, some 40 years ago, these were considered the practical upper limits for a precision approach system, although radio energy in these frequencies is somewhat difficult to control, requiring antennas of vast physical size and considerable expense.

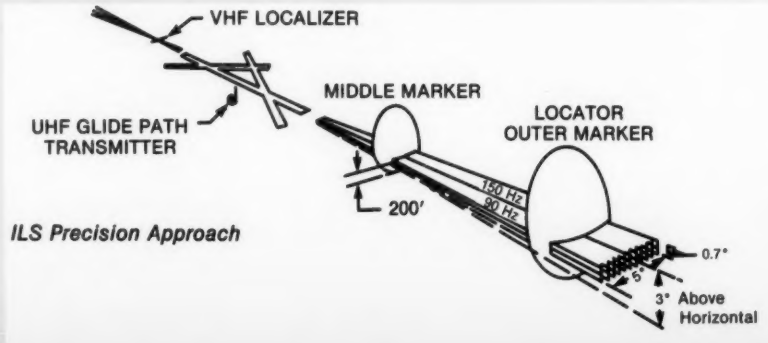
Also, because the glide slope system for ILS utilizes the ground plane for signal formation, its frequencies require tremendous areas of flat terrain for precise reflecting of the signal. Many sites require extensive grading, which sometimes still leaves the signal vulnerable to interference from buildings, moving vehicles, weather effects, etc.

By contrast, the microwave landing system operates at 5031 to 5090.7 MHz. At these higher frequencies, antennas can be built which transmit their signal directly to the aircraft. For microwave, antennas with structures of only a few meters can often provide the desired signal quite independently of local terrain features, either fixed or variable.

Another ILS problem is frequency availability. In the VHF/UHF range used for ILS there are fewer than 40 channels. Consequently, because of the need for signal protection, ILS approaches cannot be installed at some sites where it would obviously be justified by the volume of air traffic—primarily large metropolitan areas. For MLS some 200 channels are available, which should satisfy the demand for precision approach systems for many years to come.

An additional limitation of ILS is its "single approach path" availability—it is aligned with the runway and the glide path angle is fixed. The MLS azimuth signal offers positive course guidance of up to plus or minus 60 degrees from centerline; the glide slope angle can be varied from one to 15 degrees from the standard three degrees approach angle for aircraft properly certified. This can be a very effective means of avoiding obstacles and reducing noise.

MLS signals, in combination with onboard computers, also make it possible to introduce a new element of flexibility in designing IFR approaches, using area navigation types of way points and straight-line segments. This allows adjusting the approach design for the lowest possible weather minimum without loss of safety. Additionally it makes it possible to use an approach course for landing at non-aligned runways. In IFR conditions this could increase the capacity of some airports appreciably without further pavement construction of any kind. Hence, MLS technology will enable us to provide approach paths and acceptance rates for IFR traffic that will be comparable to VFR airport accessibility.



ILS Precision Approach

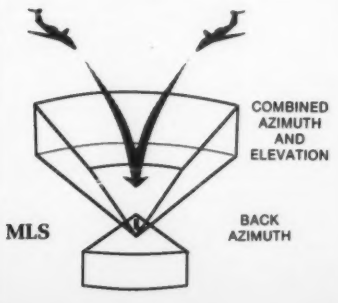
MLS gains another advantage in flexibility because it does not use fixed position marker beacons to establish position along the approach course. Instead, MLS relys on a modern, precision form of distance measuring equipment (DME/P) which provides a continuous readout of distance to touchdown. DME/P has an accuracy of ± 50 feet at touchdown, compared with ± 600 feet for conventional DME.

Civilian public use of the microwave landing system was pioneered by the now widely known city of Valdez, Alaska. Once an important mining town, and more recently the southern terminal of the Alaska oil pipeline, Valdez languished in obscurity because its location. At the head of Prince William Sound and on a narrow inlet surrounded by glaciers and high mountains, it was rendered inaccessible by air much of the year. Less than 100 miles east of Anchorage, Valdez has a very heavy snowfall (300 inches annually) and frequent low visibility, which often prevent aircraft from using the ILS approach at the airport. (The ILS minimums are 3,850 feet ceiling and three miles visibility.)

To open up Valdez to air traffic, the city bought and commissioned an MLS in 1983, and arranged for a regional air carrier, ERA Jet Alaska, to supply regular service with a DeHavilland Dash-7. The STOL (short takeoff and landing) characteristics of this 40 passenger, four engine turbo-prop made it possible to considerably reduce the IFR ceiling and visibility minimums.

These reduced minimums were made possible by designing a glide path angle of 6.2° to clear the terrain under the approach path of zero° radial. The glide path was intercepted at 11.5 nautical miles out from the runway, at an altitude of 13,000 feet MSL.

During the first 10-1/2 months of IFR operations into Valdez, ERA Jet Alaska made approximately 700 MLS approaches—two flights per day during the winter months and 3 to 4 flights per day in the summer. During this period only one missed approach was executed due to ceiling or visibility. During the first 26 months of use the MLS experienced only one "hard" failure. However, due to insufficient revenues the carrier ceased operations in 1985. The approach, which was specially designed by FAA for that type of operation, in that aircraft, is currently being re-designed for broader use.



The second IFR approach commissioned for a microwave landing system was also located in Alaska. This was at Shemya, in March of 1984, at a fog-shrouded U.S. Air Force base on the westernmost tip of the rugged Aleutian Islands. When a need was determined to install a precision approach to runway 10 it was found much less expensive to install MLS equipment than ILS. (It would have cost roughly $3 million dollars for site grading alone, for ILS, compared with zero grading costs for MLS.)

Also, the uneven terrain and the tendency of snow to pile up heavily in winter in the environs would have required construction of very large transmitting antenna for ILS; but not for MLS, which required only a 30 foot tower on the shoreline. The MLS has shown no ill effects from the very high winds that lash at the island (up to 125 miles per hour) and the heavy winter deposits of snow and ice.

Airborne Equipment

By the end of the last decade in the 20th century, as the time approaches for converting precision approach avionics to MLS, it is expected that a great variety of MLS airborne equipment will become available, probably at prices comparable to ILS airborne components. Basic equipment which has been approved by FAA for IFR use typically includes:

- A display of signal channel, azimuth course and glide angle.
- A selector for the above. (Some low-cost receivers may not have this flexibility; instead, the approach azimuth and glide path angle for a given channel will be selected automatically.)

Additionally the aircraft will require precision DME, or DME/P, and receiving antennas, usually located on the nose and under the tail.

For three dimensional precision guidance to a landing area or runway other than the primary instrumented runway, an aircraft will require what is now called a Level I MLS/RNAV receiver.This set will require, additionally, a computer with area navigation capability. More complex designs (Level II, Level III, etc.) will make possible three-dimensional approaches via straight line segments, or a computed curved path connected by a series of waypoints selected by the pilot (horizontal and/or vertical).

As MLS comes into general use and experience is gained at a wide variety of sites, it is expected that many as yet unforeseen applications will eventually make this system appear as a great a leap forward into the future of aviation as the ILS was on its adoption in the era of "beacons and bonfires."

MLS Program Status

In 1984, FAA contracted with Hazeltine Corporation to manufacture 178 Category I MLS's. FAA commissioned the first Federal MLS in Lebanon, NH in April 1989. Another Hazeltine manufactured system is at the FAA Technical Center in Atlantic City, NJ.

Due to production difficulties, system deliveries under the Hazeltine contract have been substantially delayed and none have been delivered since April 1988. The FAA and Hazeltine have been negotiating for several months on contractual issues. Richard P. Arnold, the FAA's MLS Program Manager, recently stated that "Regardless of the outcome of the FAA's difficulties with the Hazeltine contract, the MLS Program must continue. The Hazeltine contract represents less than 15% of the FAA's requirement for 1250 MLS's." The FAA will issue a request for proposal for the design and production of a limited number of Category II/III MLS First Article Test Systems within the next few months. This contract will lead to a production contract for Category II/III MLS's in the future.

The FAA recently initiated a program of nine economic and operational evaluations to assess MLS benefits and to address some long standing concerns of the aviation industry and the Congress. The overall question the FAA must address is: What are the applied operational and economic benefits that can be derived from the technical advantages of MLS? The answer to this question is critical to industry support of the program.

The Significance of ET in Instrument Flight Plans

Radio Failure Does NOT Terminate ATC Services

Several pilots have become concerned over our response to recent Forum letters (May/June 1988 and Nov/Dec 1988) in which we pointed out that the ETE called for in block 10 of the instrument flight plan is indeed the estimated time enroute from departure airport to destination *airport*. Since these pilots know from experience that before landing they will have to be directed by air traffic control to an approach fix, they believe that the ETE should be, and always has been, measured to a fix, not an airport. Any other procedures, they argue, might interfere with the safety of the IFR operation, especially if some mishap occurs enroute, such as loss of radios. They claim that their view is supported by various FAA regulatory or advisory statements, which contradict our "new" interpretation.

There is in fact nothing new or interpretive in our response. The flight plan form specifically requests the name of the destination airport and city. We know of no contradictory statements in the AIM, the regulations, or the controller's handbook.

The ETE to a fix may not be known when the flight plan is filed because the approach to be used may itself not be known at this time. The ETE to the destination airport was never intended to be a precise calculation of the time enroute along a precise flight path. It is simply a kind of estimate which helps ATC anticipate and follow the progress of your operation, and establishes a point in *time* for sequencing you into arriving traffic at the airport.

Some pilot/readers have expressed their concern that if they file to an airport instead of a fix, their actual flight path in the vicinity of that airport will not be known to controllers and could cause a problem in the event of radio failure. This is untrue; the departure clearance may contain a clearance *limit* point, which could be an initial approach fix, but could also be any point along the approved flight plan. Subsequent ATC clearances will define the actual route to an IAF. If the clearance limit is the destination airport, ATC would expect the pilot to proceed to an appropriate Initial Approach Fix and commence descent and/or approach as close to the filed or amended ETE as possible.

Let us try to clear up this matter by considering a simple IFR flight, and the manner in which it would be affected by loss of radios.

Two-Way Radio Failure in IFR Conditions.

If the failure occurs in IFR conditions, or if paragraph (b) of this section (landing under VFR conditions) cannot be complied with, each pilot shall continue the flight according to the following:

ROUTE.

1. By the route assigned in the last ATC clearance received;
2. If being radar vectored, by the direct route from the point of radio failure to the fix, route, or airway specified in the vector clearance;
3. In the absence of an assigned route, by the route that ATC has advised may be expected in a further clearance;
4. In the absence of an assigned route or a route that ATC has advised may be expected in a further clearance by the route filed in the flight plan.

ALTITUDE. At the highest of the following altitudes or flight levels for the route segment being flown:

1. The altitude or flight level assigned in the last ATC clearance received;
2. The minimum altitude [converted, if appropriate, to minimum flight level as prescribed in FAR §91.81.(c)] for IFR operations; or
3. The altitude or flight level ATC has advised may be expected in a further clearance.

NOTE. The intent of the rule is that a pilot who has experienced two-way radio failure should, during any segment of his route, fly at the appropriate altitude specified in the rule for that particular segment. The appropriate altitude is whichever of the three is highest in each given phase of flight:

(1) The altitude or flight level last assigned;
(2) the MEA or
(3) the altitude or flight level the pilot has been advised to expect in a further clearance.

Dulles to Seven Springs

SCENARIO I - IFR to 7SP. Let's assume that we have filed a Part 91 IFR flight plan from Dulles International Airport near Washington, DC, for Seven Springs Borough Airport in southern Pennsylvania. In our "route of flight" box we request direct via Martinsburg (WV) VORTAC, airway V214 to the Indian Head VORTAC ("DIRECT MRB—V214—IHD"). We file for altitude 8,000 feet. Our destination block is marked "7SP," the identifier code for Seven Springs Borough Airport. (At some terminals the same identifier code is used for the airport and an associated NAVAID). However, air traffic control will interpret the code in the destination block differently from the code in the *route of flight* block.)

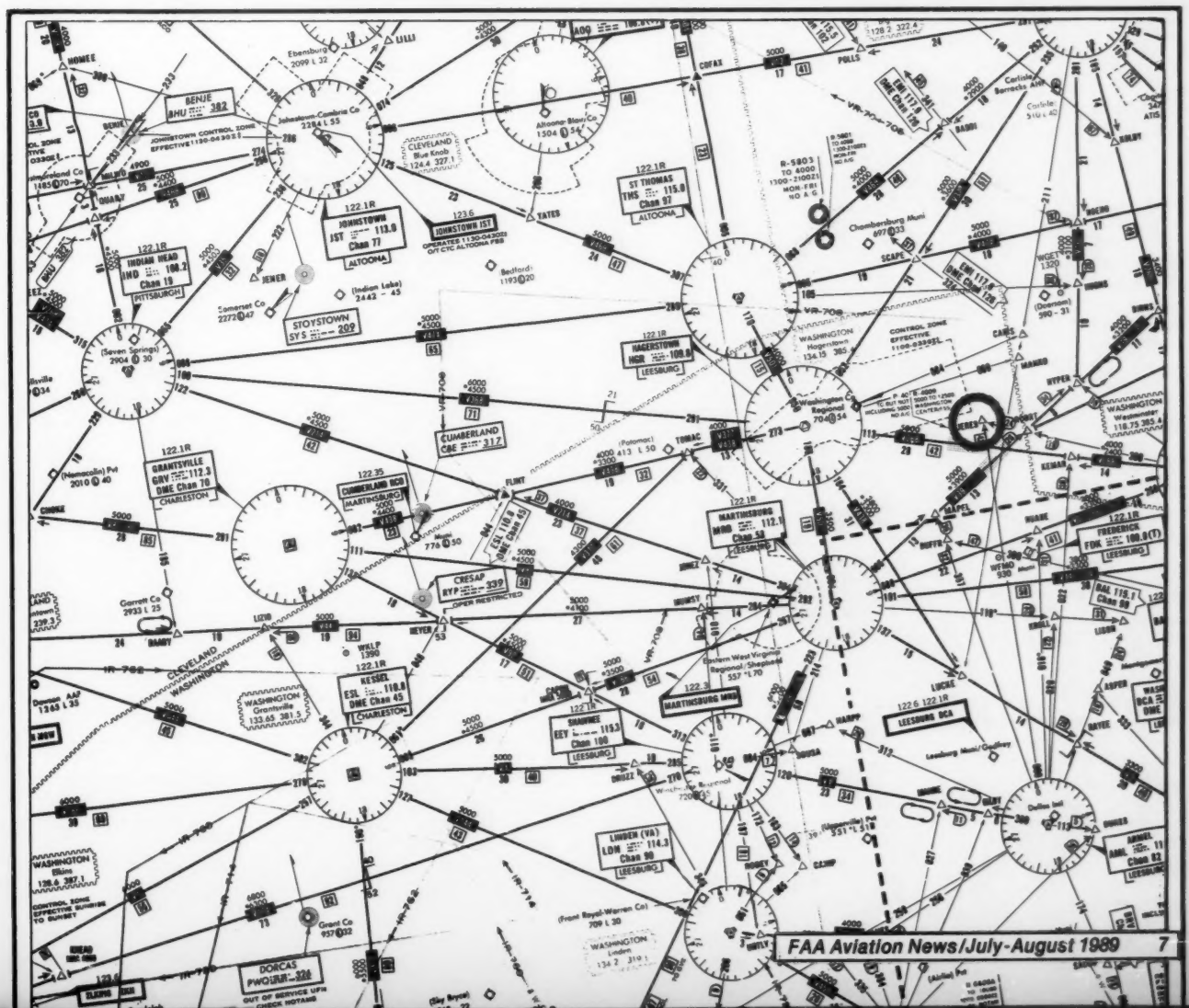
Our estimated time enroute, given the distance between airports (108 nautical miles), considering winds aloft, the cruise speed of our light single, plus allowances for departure and arrival, add up to one hour and ten minutes.

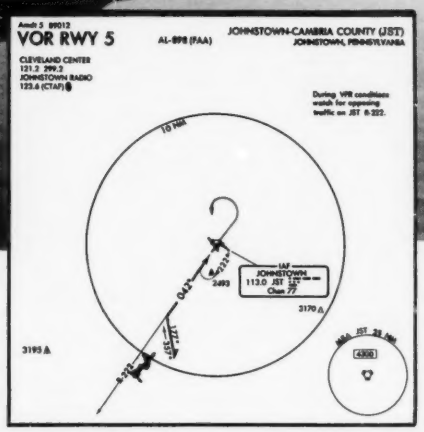
We are cleared as filed for 8,000 feet. We take off, are vectored to Martinsburg VOR, and continue on V214. At Flint intersection we are handed off to Cleveland Center, which instructs us to report over Indian Head VORTAC. We do so, are cleared for the approach, and land. Our actual time enroute turns out to be two minutes longer than our estimate, but that in no way degrades the safety of our operation, which in all likelihood was carried out entirely under radar surveillance—in addition to being monitored in accordance with our departure clearance.

Com Radios Out

SCENARIO II - Loss of Two-Way Radio in VFR Conditions. Supposing that during this IFR flight, on our arrival over the Flint fix, we discover that we have lost our communications radios. If this happened in VFR conditions, we would continue the flight under VFR, land as soon as practicable, and call ATC to cancel out the flight plan. NOTE: The requirement to "land as soon as practicable" should not be construed to mean "as soon as possible." The pilot is expected to exercise his/her best judgement and is not required to land at an unauthorized airport, at an airport unsuitable for the type of aircraft flown, or at a field only minutes short of destination. Our preflight and updated weather briefings should enable us to decide, if the need arises, where we could quickly find a VFR airport—perhaps Potomac Airport (PA) on V438.

At the same time, we would turn up the volume in our NAV radio tuned to the VORTAC, since standard practice would call for ATC to try to contact us via a voiced NAVAID. We would be requested to acknowledge reception by identing or squawking a discrete code on our transponder—or by a directed maneuver, which would be observed on radar. We may also be asked to indicate whether we were in VFR weather. If desired, vectors toward a VFR airport might be provided. Even in an area without radar coverage, or in the absence of a transponder on board, reference to our flight plan ETE (en route estimates), as amended orally over Martinsburg, would enable ATC to establish our approximate position near Flint, and to assist us in accomplishing a safe landing at a VFR airport.





IFR Without Radios

SCENARIO III - Loss of Two-Way Radios in IFR Conditions. If we found our com radios inoperative at Flint while solidly in IFR conditions, we would be expected to continue the flight IFR and land at Seven Springs as planned. Even if ATC were unable to contact us via a voiced NAVAID (possibly because of a defective speaker on board, or terrain interference) we would continue our flight in accordance with FAR §91.127 instructions concerning loss of two-way radio communciations in IFR flight (See boxed summary of rules.)

In our case, we would be expected to proceed via the filed route to an appropriate Initial Approach Fix (IAF). Although the minimum en route altitude shown on the chart for the remaining segment of V214 is 5,000 feet AGL, we would be obliged to maintain 8,000 feet, since this was our last assigned altitude (traffic conditions, as well as terrain clearance, are considerations used in assigning IFR altitudes).

At the IAF we would be expected to begin the approach as close as possible to the time indicated by our *flight plan ETE*—or as amended en route. If we arrived ahead of schedule at the VORTAC, we would hold until the ETA. Upon landing we would telephone ATC to confirm our arrival at the airport.

To some pilots it does not seem logical, or "right," that we should use ETE to the airport as a basis for the time at which we would leave the approach fix and initiate the approach. Nevertheless, this is the procedure called for in the rules, and should be followed. In our example for the flight to Seven Springs it would make little practical difference whether the ETE was actually computed to the airport or the VORTAC, but in other conditions, where various approach point fixes could be located well beyond or well ahead of the airport, the time difference could be important—especially if radio communication is lost.

We would expect ATC to be following our flight on radar and to protect the airspace for our approach for at least 30 minutes after the expiration of our ETE, as amended, if necessary, enroute. It is highly recommended that, if not in radar contact, we inform ATC if we fall behind or get ahead of any ETA's in excess of three minutes).

Landing at the Alternate

SCENARIO IV - Missed Approach, Following Loss of Two-Way Radios. If after executing a missed approach because of severely deteriorated weather conditions, we would be expected to proceed to our alternate destination airport via the nearest convenient airway. In a radar covered environment, ATC would become aware of our intentions and would so advise the facility controlling the approaches to the alternate.

If as an alternate to Seven Springs we had selected Johnstown/Cambria County, we would proceed on Victor 35 to the Johnstown VOR, and then commence any approach which seemed appropriate. We would expect the controllers to protect our airspace, and we would call them immediately upon landing.

It is important to review FAR §91.127 frequently in order to assure that in the event of a problem such as radio loss you will know exactly what ATC expects you to do, and ATC will be able to anticipate your actions. The regulations have been worked out on a basis of considerable flight experience, careful reflection, and common sense. Full compliance is your best means of dealing with a threatening situation.

It is virtually impossible to provide regulations and procedures applicable to all possible situations associated with two-way communications failure. When confronted by a situation not covered in the regulation, pilots are expected to exercise good judgment in whatever action they elect to take. Whether the equipment failure constitutes an emergency depends on the circumstances, and in any event, it is a determination made by the pilot. FAR §91.3(b) authorizes a pilot to deviate from any rule in Subparts A and B of FAR Part 91 to the extent required to meet an emergency. In that event, the air traffic service will endeavor in every way possible to assist you to a safe landing.

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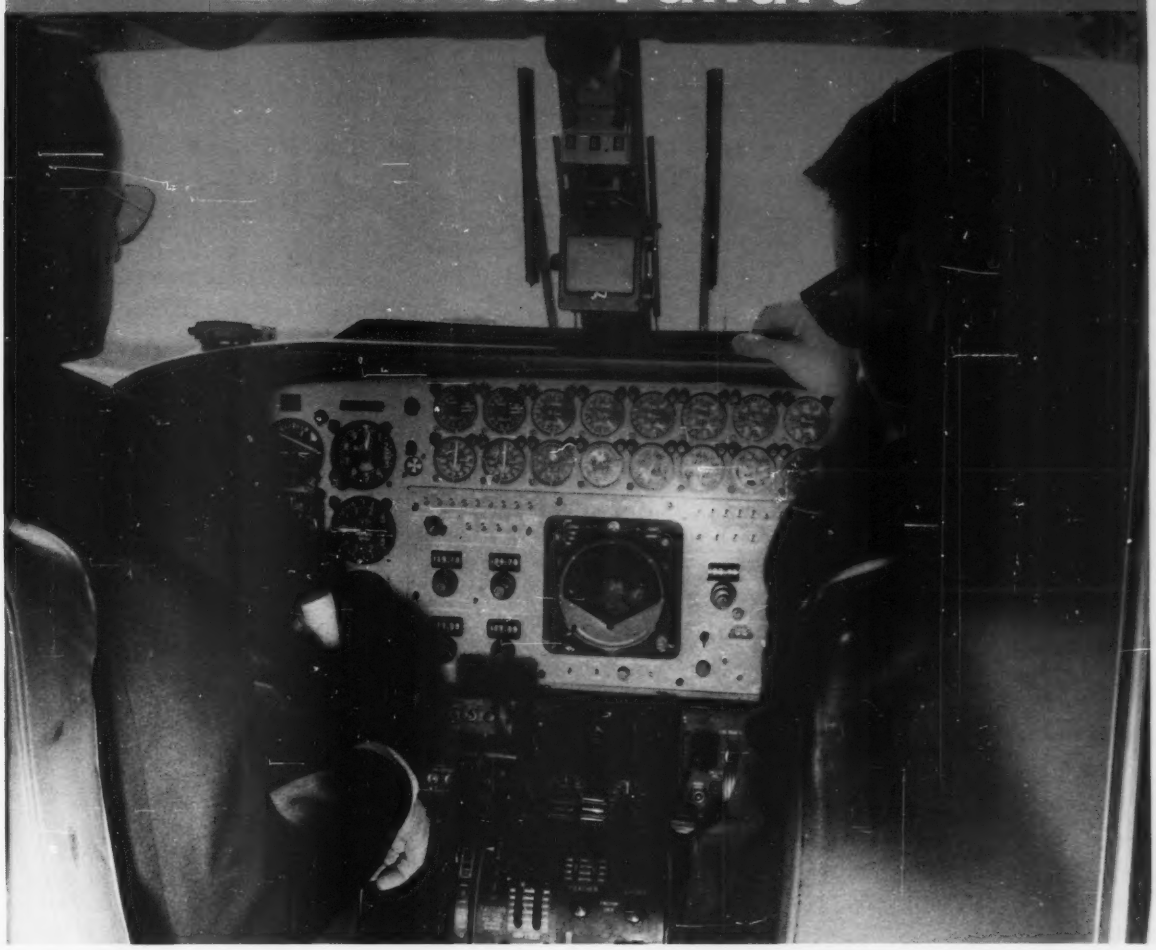
INFLIGHT
Electrical Failure



How would you feel if you suddenly lost all electrical power just as you were preparing to land at a small airport in the pitch darkness of midnight? You can't see the panel instruments, you can't communicate, and you can't lower the gear manually because you can't find the gear crank in the dark. You have no source of illumination—no flashlight, not even a bent match stick. What will you do?

A situation of this kind was experienced by the pilot/owner of a twin *Commanche* recently in central Missouri. Accompanied by one passenger, the 500 hour pilot, a local physician, had taken off from Popular Bluff at 9:10 p.m. on a short flight to Rolla, MO. The June night was very dark, with ceiling 4,000′ scattered, 12,000′ broken. The flight was conducted VFR, apparently routine, except that as he settled into his cruise altitude the pilot noticed his wingtip lights and his panel lights seemed to be "less bright than usual." Everything else seemed in order.

Descending toward Rolla, the pilot reduced speed and flipped the switch to lower the landing gear. He was greeted by a sudden and complete blackout of the entire lighting system, as well as radio failure. Holding his course visually toward the lighted airport, the pilot groped frantically for a flashlight but found none, nor any matches. He suspected that the landing gear was not fully down or locked, but he had no way of confirming his suspicions. (He was not aware of the veteran pilot's emergency technique for locking the gear by means of a sharp pull up—which may work.)

In the darkness of the cockpit he could not find the wobble pump handle for lowering the gear by hand. He established what appeared to be a normal glide angle for the landing approach, reduced speed as much as he dared, and hoped for the best. On touchdown the gear collapsed and the airplane skidded to a stop at the edge of the runway with only moderate damage and, fortunately, no injuries to the pilot or his passenger.

Investigators who inspected the cockpit immediately after the accident found the master switch on, but the generator switch in the "Off" position.

The pilot recalled that after noticing the dimness of his lights he had checked the master switch and the magnetos, but not the generator switch. He was in the habit of leaving the generator switch on at all times, and therefore had no reason to think it might be otherwise. However, he also recalled that some hours before departing Popular Bluff he had instructed a mechanic to replace the rotating beacon light on his airplane, and it was possible the mechanic had left the generator switch off.

The pilot said he was aware of the ammeter instrument in the panel, but he was not sure he always observed it in his panel scan. He has "learned his lesson," and now reads the ammeter aloud as part of his instrument scan; and double checks the position of both switches.

This pilot and his passenger were lucky. Electrical failures, especially at night, often have serious or tragic consequences. In a recent accident involving a twin *Aztec* near Seattle, all eight persons on board died when the pilot attempted to land in IFR conditions without electrical power. Over a 27 months period, mid-February 1986 through April 1988, there were 41 accidents in which electrical failure was a principal factor, according to the National Transportation Safety Board. Six of the accidents were fatal, with 9 fatalities; 18 persons were injured. There were three in-flight fires, and two cases of fire erupting on the ground.

Most of these accidents could have been prevented if the pilots had a better understanding of aviation electrical systems and had used better scanning practices to monitor these systems.

Modern flying has become very dependent upon the so-called auxiliary electrical system (which includes electrically powered accessories). An in-flight failure often precipitates an emergency situation, especially at night, in IFR conditions, or VFR over unfamiliar terrain.

In-flight electrical power is provided by a generator or alternator, most of them belt-driven by the engine and basically similar to those used in automobiles. A battery, either 12 or 24 volts, is used to start the engines and supply excitation to the alternator or generator. It can also serve as a temporary backup for limited electrical power aloft in the event of a generator/alternator failure. The third component of this system is the voltage regulator. One of its functions is to direct additional current from the charging source (generator or alternator) into the battery when it is low—normally only after starting an engine. The primary task of the regulator is to maintain the battery at a constant (12 or 24) voltage.

This point is important for a correct reading of the two types of ammeters. One type, usually called a "loadmeter," measures the amperage being drawn from the charging system, on a scale from zero to maximum output. This ammeter refers only to the generator/alternator output, not to battery function. In flight, the loadmeter needle should move progressively up the scale as you turn on more electrical components, and descend as you turn them off. If the needle does not move, or descends without your shutting off electrical equipment, you have a failure in the charging system (or in the ammeter itself) and the battery may be supplying all electrical power.

Note that the loadmeter will not tell you directly that the battery is being discharged; you infer this from the lack of load indication on the instrument. Some aircraft use the type of ammeter which is wired directly to the battery and shows the battery's approximate rate of charge or discharge. This type of meter should show a positive charge rate immediately after starting and a zero or very slight charge reading in cruise flight. Any significant charge or discharge reading of the battery ammeter in flight will indicate a malfunction of the charging system and a depletion of the battery power.

The difference between the two types of ammeters is important. If a pilot normally flies with a center-zero (battery) meter in the panel and is used to seeing the needle on zero in flight, with a loadmeter this could indicate trouble. Either instrument will do the job, when read correctly.

Most in-flight failures of the electrical system are located in the generator or alternator—perhaps these are the only parts that are subjected to mechanical wear. Alternators, which have supplanted generators in recent years, have the advantage of supplying power at a much lower rpm rate than generators. The alternator has one significant disadvantage which must be remembered. It will not supply current when connected to a fully discharged battery (as a generator may).

If you have an alternator and your battery is low, you are advised to ascertain the cause before departing (even if you start up using a ground power source) rather than risk flying off with a depleted battery and a non-charging alternator. Your battery could have just enough charge left to power your radios temporarily during your departure since new technology, such as fully transistorized radios, draw very little amperage—but not enough power to "excite" the alternator to begin charging. The battery would soon be depleted if the flight were to continue.

The aircraft must not be flown with a battery which is not charged to its design level of charge. To do so is contrary to the airworthiness requirements of the FARs.

Whenever a battery has trouble starting up the engine, it is easy to assume the voltage is down because someone has left a switch on overnight, or that cold weather has made the engine very difficult to turnover, and all will be well once the engine starts up. But a weak battery often points an accusing finger at the charging system, or poor battery maintenance, and this should be checked out carefully by a mechanic. A simple test is to turn the landing lights on and off after start-up. If your charging system is working, the loadmeter needle should move up and down or the battery ammeter needle should hold steady. Note that this does not ensure that

Table 1.

Electrical Load Analysis Chart for a Light Twin (Beach Baron)

Item	Number of Units	Total amperes 24-volt system
A. Continuous Load:		
Pitot Heat (Operating)	1	3.30
Wing Tips Lights	4	3.00
Heater Ignitor	1	1.20
**Navigation Receivers	1-4	1-2 each
**Communications Receivers	1-2	1-2 each
Fuel Indicator	2	0.76
Instrument Lights (overhead)	2	0.60
Engine Indicator	2	0.60
Compass Light	1	0.20
Landing Gear Indicator	1	0.17
Flap Indicator	1	0.17
B. Intermittent Load		
Starter	2	200.00
Landing Lights	2	17.80
Heater Blower Motor	1	14.00
Flap Motor	1	13.00
Landing Gear Motor	1	10.00
Cigarette Lighter	1	7.50
Transceiver (keyed)	1	5-7
Fuel Boost Pump	2	4.20
Cowl Flap Motor	2	2.00
Stall Warning Horn	1	1.50

** Amperage for radios varies with equipment. In general, the more recent the model, the less amperage required.
NOTE: Panel and indicator lights usually draw less than one amp.

Emergency Procedures for Loss of Two-Way Radio Communication

- If failure occurs in IFR conditions or if VFR conditions cannot be maintained, the pilot shall continue the flight according to the information given on page 6.
- If failure occurs under VFR conditions, land as soon as practicable.
- If minimal power remains, transmit a may-day over the radio, then turn off the radio and everything except the transponder. Tune the transponder to code 7600 for 15 minutes to indicate two-way communications failure. The transponder uses less power than the transceiver, and this procedure enables special attention to be given your problem by air traffic control, provided, of course, you are under radar coverage. If not, use your radio sparingly.

the battery is accepting or maintaining a charge, just that the system is supplying power and is being regulated. Failure to check the status of the charging system could lead to electrical failure in critical conditions of light.

Just how useful is the battery as a backup power source after failure of the charging system in flight? That depends on the state of the battery. A fully charged 30 amp battery in perfect condition, for example, may theoretically supply 30 amps for one hour, or 15 amps for two hours. However, no ammeter can tell you how much power remains in the battery at a given point in the flight.

It is good practice to assume you are low on electrical power whenever your ammeters show that the charging system is not working normally, and/or the battery is discharging in flight. Make a precautionary landing as soon as convenient. In the meantime you can conserve battery power by turning off all electrical equipment you can do without. You will have to use judgement for such items as pitot heaters and navigation lights. Modern radio receivers and transponders draw minimal current, usually in the neighborhood of one or two amps, so these are usually left on. (See Table 1 for amperage loads.)

Frequent keying of the microphone uses considerable electricity, so try to get a complete message through on your first transmission, after acknowledgement. At night, locate anything you will need in the cabin (flashlight, gear crank, checklist, etc.) while you still have illumination.

If you are depending on the battery only, and the battery ammeter needle begins to center itself, you know that you are just about out of current. Recall which instruments and equipment are electrically driven while making your descent, and plan your landing accordingly.

Aircraft, that have radios or other electrical equipment installed by other than "the factory," may have circuits configured in nonconformance with original design. Owners should ensure that any differences are clearly identified and all modifications are verified as being compatible with other systems in the aircraft.

Electrical failure in aircraft sometimes occur as a result of a short in the wiring or a sudden surge of electricity, or overload, which results in a blown fuse or popped-out circuit breaker. If the problem is a temporary overload, you can simply replace the fuse or reset the circuit breaker. One common cause of overload is leaving radios on when starting the engine. This can also damage the radios.

FAR §91.33 requires that a complete spare set of fuses, or three fuses for each type required, be carried on board for IFR flight or VFR night flight.

Bear in mind that the circuit breaker is heat-actuated, and should be allowed to cool momentarily before being replaced. If the breaker continues to pop out despite these precautions, leave it out, turn off the associated component, and land as soon as the situation dictates.

With a little foresight, electrical failures will not lead to accidents. Reading the meter on the panel is not that difficult

Pilot Preventive Maintenance

Pilots are permitted to change fuses, light bulbs, reflectors, lenses, and broken wiring on landing lights. They may also check the battery charge (specific gravity) and fluid level and inspect the terminals for signs of corrosion (white powder) or leaks from cracks in the casing. The battery should be firmly attached to the frame and the environment free of loose metal objects which might fall across the terminals and cause a short or fire. Summon a mechanic if the generator/alternator seems loosely attached, or there is evidence of burning or arcing, or the belts are loose or cracked. The pilot may replace a dead battery, but that will not solve his problem if it was caused by a fault in the charging system. If the battery case shows signs of bulging or other distortion, it is not airworthy and should be replaced.

Student Pilot Priviledges Reviewed

FLIGHT FORUM REVISITED

EDITOR'S NOTE: *Over the years we have received many requests that we publish a collection of the correspondence that has appeared in the "Flight Forum" section of the magazine. That would be a massive undertaking since much of the information given would have to be updated in the light of subsequent rule and policy changes. However, we intend to publish from time to time a selection of correspondence on a given subject which has been updated and edited as necessary. The following is a variety of questions concerning the privileges and obligations of the student pilot.*

• **Pilot or Passenger?** (January 1976)

Q. Can a certificated and qualified pilot fly with a student pilot who is flying the aircraft? The qualified pilot does not have an instructor's rating but, on the other hand, I would think he cannot be considered a passenger as he is qualified to legally fly the aircraft.

A. A student pilot may not carry any passenger. In the situation you describe, the student would be a passenger—even if she/he is sole manipulator of the controls. The qualified pilot would be PIC. The student may not log the flight time toward any requirements for a pilot certificate or rating.

• **Student Logs** (July 1977)

Q. You have published a number of letters explaining why a student pilot may not log time as PIC when another person is in the cockpit logging pilot-in-command time and they have certainly served to clarify this matter. However, I have seen nothing about students logging pilot-in-command time when alone in the aircraft. Most FAR references to student pilot time are termed "solo" flights.

My question is, can a student pilot log his solo flight time (or any other time) as pilot-in-command time and therefore have it count as required pilot-in-command time for additional ratings? Also, if the student is manipulating the controls with a CFI on board, can this time be logged for future use as PIC time?

A. A student pilot may not log pilot-in-command time whether or not there is another person in the cockpit. A student may not carry a passenger; therefore the other pilot on board would have to be the PIC.

When a student pilot is flying with a certified flight instructor the CFI is the PIC regardless of who is manipulating the controls.

• **Confessions of a Perfect Pilot** (Nov/Dec 1977)

Q. I hear so much criticism of FAA regulations and personnel but I have only admiration for your organization and the people who staff it. Of course an FAA man or woman—being human—may have a bad day and be a bit brusque. As a retired Army Sgt. Major I am perfect, but I realize not everyone is!

However, one day when I was working toward my private pilot license I got slightly off course between Newport News and Lynchburg, VA, while I was on my required long crosscountry flight. Remembering my instructor's advice to "confess and communicate" I called the Lynchburg FSS on my radio and explained my problem. Without delay I was vectored to the nearest airport (Farmville) to refuel and then went on to Lynchburg with no problem. There was no need to declare an emergency.

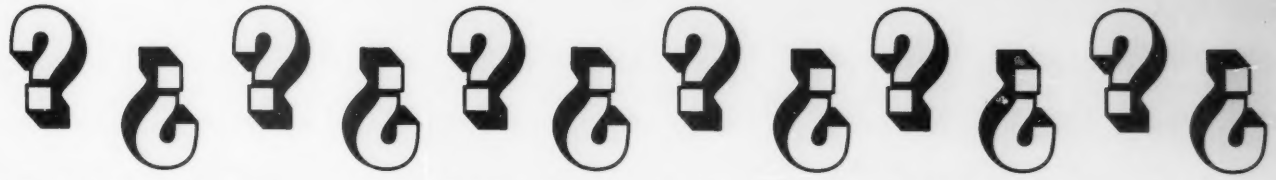
My question is, did this unscheduled stop invalidate my crosscountry flight?

A. The answer to your question is no, the crosscountry flight is not invalid as long as you finished the flight and a proper endorsement is made by your flight instructor and the flight meets the requirements of FAR §61.109(b)(2).

• **Flying Turbulence, IFR** (May 1978)

Q. In helping a student to prepare for the FAA Instrument Written Exam, I have found little official reference on flying turbulence. Could you please point me in the direction of information on handling altitude and airspeed and the priorities for each which the FAA suggests?

A. Try the advisory circular, "Aviation Weather" (AC 00-6A, stock number SN 050-007-00283-1) or "Instrument Flying Handbook" (AC 61-27C, stock number SN 050-007-00585-7). Both are available from Superintendent of Documents, GPO, Washington, DC



20402 for $8.50 each. Also check with your GADO or FSDO for free accident prevention publications on this subject.

Flying in turbulence IFR is about the same as flying in turbulence VFR, except that if you are IFR you may have to discuss altitude, route or airspeed changes with ATC before deviating from your clearance to find smoother air.

• **Change of Address** (Jan/Feb 1980)

Q. I am a student pilot with a student certificate and 2nd Class Medical. I will be changing addresses shortly and would like to know if a student pilot must comply with FAR §61.60 requiring that FAA's Airman's Certification Branch be notified? If so, will I get a new certificate with whatever endorsements I already have?

A. Affirmative. Send your name, old address, new address, Social Security Number, and certificate number to DOT/FAA, Airman Certification Branch, AVN-460, Box 25082, Oklahoma City, OK 73125. No new certificate will be issued, but the address change will be in the computer. Unless this is done within 30 days following the move, the student certificate— or any pilot or instructor certificates—privileges may not be exercised.

• **Solo Mio!** (Jan/Feb 1982)

Q. In the past there have been a number of questions in the "Forum" regarding student logging of solo time, when he or she is the sole manipulator of the controls. My question is, can a student ever *legally* log solo time as PIC time?

A. A student pilot may log solo time when she/he is the sole occupant of the aircraft. The student may not log any time as PIC—whether or not the student is manipulating the controls has nothing to do with this issue. (A student acting as a PIC of an *airship* in accordance with FAR 61.51(c)(1) is an exception.)

• **Before or After Solo** (Nov/Dec 1982)

Q. Some flight instructors at our flight school have different opinions about the following. We all know that a student pilot certificate must be endorsed before solo flight and that the student's logbook has to be endorsed as well. What we can't agree on is whether the logbook should be endorsed before or after the first solo flight. I say it doesn't matter as long as it gets done. Could you straighten us out?

A. According to FAR Part 61.87(m), a student pilot may not solo until both the student pilot certificate and the pilot logbook have been appropriately endorsed prior to the flight.

• **The Doctor's Secret** (March/April 1983)

Q. The names and addresses of pilot schools, airworthiness inspectors, designated pilot examiners, etc., are published as a part of FAA's advisory circular system. However, the directory of FAA-designated Aviation Medical Examiners is a well-kept secret. Any reason why it could not be an advisory circular as well?

A. The demand for the entire list, which is voluminous, is not sufficient to warrant publishing it as an advisory circular. Names of AME's are often passed on by word of mouth or recommendation. They are also available from any FAA regional air surgeon, Flight Standards or General Aviation District Office, or from the Aeromedical Medical Division, AAM-400, Mike Monroney Aeronautical Center, P.O. Box 25082, Oklahoma City, OK 73125.

• **Proper Endorsements** (Nov/Dec 1985)

Q. I would like clarification on the following: Student X soloed on February 16, continued to train, and received an endorsement to fly solo crosscountry. Only one dual flight was taken between April 1 and June 16. On June 16 the student had a dual session, and the instructor noted in the logbook that ground reference maneuvers, minimum control airspeed, and landings were accomplished.

1. Does this endorsement constitute the 90-day review required in FAR Part 61?

2. When the student arrives to fly solo, how does the dispatcher or chief flight instructor know that the 90-day review was completed satisfactorily?

Please advise the proper endorsement for this student which would assure correct CFI supervision required.

A. Unless the flight instructor specified in the endorsement that he/she found the student competent for solo flight, the June 16 sign-off could not be considered a 90-day review endorsement.

A dispatcher or chief flight instructor would determine the student's status by examining the logbook for the proper endorsement. (The entry that you gave is not a proper endorsement.) The student would have to fly with an appropriately rated instructor and receive a current solo endorsement.

Guidance for proper endorsements, including necessary elements and suggested language, can be found in Advisory Circular 61-65B, "Certification: Pilots and Flight Instructors." It is available free from DOT Utilization and Storage Section, M-443.2, Washington, DC 20590.

• **Interrupted Training** (Nov/Dec 1985)

Q. Are student pilot training hours good indefinitely? I stopped flying in 1981 with 33 hours logged. Can those hours be applied to my total time after four years?

A. Affirmative. However, you might find that after four years, additional recurrent instruction will be needed to bring your skills up to par for certification.

• **Student and the TCA** (May/June 1988)

Q. Can you settle the question of whether a student pilot, whose aircraft is properly equipped with radios, Mode-C transponders, etc., is allowed to enter a TCA?

A. A student pilot, with a properly equipped aircraft, may be permitted to conduct certain operations within a TCA, except at the 12 busiest TCA primary airports where student pilot operations are presently prohibited and will continue to be prohibited even with an endorsement.

In order to be permitted to operate solo in a TCA, a student must obtain specified training and logbook endorsement from his/her certified flight instructor prior to conducting such operations. In addition, training operations in or through a TCA may be required to be conducted along routes and/or in accordance with written procedures developed and specified by the ATC facility having jurisdiction over the TCA. ■

INSTABILITY UNLIMITED. The Grumman X-29, experimental jet built for NASA, has a forward swept wing (20% less drag), canard horizontal stabilizers, and a total lack of inherent stability that make the aircraft extremely responsive. The three on-board computers perform 40 flight monitoring functions per second and "vote" on the best action in response to the pilot's desires, which are conveyed electronically.

The X-29 is part of the latest exhibit, "Beyond the Limits," which traces the historic role of computers in expanding the realm of flight and flight training. This exhibit is in the Smithsonian's Air and Space Museum in Washington, DC.

COMMENTS INVITED ON ALCOHOL/DRUG ABUSE PROPOSAL

FAA is inviting comments on a rulemaking proposal that would empower the agency to deny, suspend, or revoke airman certification of persons who have recently violated state laws concerning the operation of a motor vehicle while under the influence of alcohol or other drugs.

The proposed rule would require pilot applicants and certificated pilots to report to the FAA Airman Certification Branch any alcohol or drug related convictions or administrative actions by a local authority within the three years preceding the effective date of the final rule. Convictions or administrative actions of this nature occurring after the rule's effective date would have to be reported to FAA within 60 days of the event.

This would bring about an automatic expiration of a pilot's medical certificate on the 61st day after conviction or final administrative action. To obtain a new medical certificate, the pilot must show the FAA-designated aviation medical examiner evidence of participation in any court-ordered or other alcohol or substance abuse treatment program.

The proposal also adds an "express consent" provision to permit FAA access to information reported to the National Driver Register on each person who applies for or receives an FAA medical certificate.

Comments must be marked Docket No. 25905 and should be sent in duplicate to FAA, Office of the Chief Counsel, Attn: Rules Docket, AGC-204, Docket No. 25905, 800 Independence Ave., SW, Room 915G, Washington, DC 20591. Deadline is July 17, 1989.

HISTORICAL SERIES

A fifth volume has been added to the series detailing the history of the CAA/FAA. The latest book, *Troubled Passage: The Federal Aviation Administration During the Nixon-Ford Term, 1973-77*, tells the story of the agency during those troubled years and covers major issues of safety, security, and the development of the civil aviation industry. It is available from the Superintendent of Documents, U.S. GPO, Washington, DC 20402 at a cost of $13.00 (Stock Number SN 050-007-00783-3).

MODE C RULE EFFECTIVE NOW

As of July 1, 1989, Mode C (altitude encoding) transponders are required for aircraft operating in en route airspace at or above 10,000 feet MSL (except that airspace which is below 2,500 feet AGL) in the 48 adjacent states and the District of Columbia. Mode C is also required for aircraft operating within a 30 nautical mile radius of a Terminal Control Area primary airport, from the surface up to 10,000 feet MSL.

Excepted from this rule are gliders, balloons and other aircraft without an electrical system.

LOW TIME PILOTS FACING ANNUAL FLIGHT REVIEW

Effective August 31, 1989, non-instrument rated private pilots who have logged fewer than 400 hours of flight time may not act as pilot-in-command unless they have taken an official flight review within the preceding 12 *months*. In accordance with recently enacted legislation (FAR §61.56), for such pilots the Annual Flight Review (AFR) replaces the Biennial Flight Review (BFR). Recreational pilots with fewer than 400 flight hours will also come under the new AFR rule, but the BFR is still required for all other pilots.

However, in order to make a smooth transition into the new requirements, some carry over of a current BFR will be honored. If the BFR was taken prior to August 31, 1988, it will be valid for two years from the date it was taken. A BFR taken on or after August 31, 1988, will be valid only for one year from the date it was taken.

A flight review consists of a review of the current general aviation operating and flight rules, and those maneuvers and procedures which, at the discretion of the person authorized to give the review, are necessary for the pilot to demonstrate the safe exercise of the pilot certificate. Alternately, a flight proficiency check for pilot certificate, rating, or operating privilege conducted by the FAA, an approved pilot check airman, or the U.S. Armed Forces will also satisfy the requirements of this regulation.

Questions on this subject may be addressed to the nearest FAA Flight Standards or General Aviation District Office or to the FAA Certification Branch, AFS-840, Washington, DC 20591 (telephone 202-267-8196).

AIRCRAFT OWNERSHIP PROOF

Pilots and owners of U.S. aircraft which are operated abroad should understand that a duplicate copy (pink slip) of the aircraft registration application (form 8050-1) is not considered adequate proof of proper registration by U.S. Customs Officers.

Aircraft for which only the "pink slip" is presented upon return to the U.S., are being held by U.S. Customs Officials until proof of ownership is verified by FAA's Aircraft Registration Branch in Oklahoma City.

Telexed copies of the registration certificate are being accepted as ownership proof by Customs. However, the Registry will only telex to the individual whose name appears on the application as the registered owner of the aircraft, so it would save time to have the copy on the aircraft before it leaves the country. The Aircraft Registration Branch's telephone number is 405-680-3548.

• Unintentional Reversal

The topic of estimating Block 10 time enroute has been mentioned more than once. In May/June 1988 you confirmed that the time should include the lapsed times until over the point of first intended landing. One year later you state that Block 10 should provide the estimated time to arrival at the initial approach fix. Which, please?

Richard Peterson
Seattle, WA

Block 10 in the IFR flight plan should contain the ETA at the destination airport. Our statement in the May/June issue was an inadvertant error—DISREGARD! Please see the article in this issue "The Significance of ET" for a full discussion on this subject.

Thank you for calling our attention to the error.

Not By TV Alone

Your article in the March/April edition entitled "The Best Weather Presentation in the World" was very informational. However, the statement that the FAA gave an award to AM Weather for providing pilots with information to make the safest flight possible was alarming.

As a career Air Traffic Control Specialist I take exception to that statement. The Flight Service Station is where a pilot should be getting his weather briefing. It is tailored to his specific needs. Pilots having read the article may think that all they have to do is watch AM Weather to make a go, no-go decision.

In addition, FAR §91.5 says a pilot must utilize all available data before initiating a flight. AM Weather can cover much of that requirement, but certainly not all of it. Pilots should be encouraged to get a complete weather briefing from those trained for that specific purpose; their Flight Service Station Specialist.

Robin M. Craviotto
Soldotna, AK

Our article did point out that watching AM Weather helped prepare pilots to understand an FSS weather briefing. However, we agree with you that in many circumstances a TV weather briefing alone, however excellent, would not satisfy a pilot's requirements.

Medical for CFI Practical Test

If FAA will allow certified flight instructors to instruct with less than a current Class II medical, when they are not acting as a required crew member, why must a CFI candidate have a Class II medical in order to take the CFI flight test?

Name Withheld

Present regulations require that a candidate for instructor certification holds at least a commercial pilot certificate, which requires at least a second class medical certificate. The privileges of a commercial pilot may not be exercised if the second class medical becomes invalid—with one exception, which allows a CFI to give qualified instruction under certain circumstances with less than a valid second class medical certificate.

A CFI candidate who is otherwise qualified may take the practical test while holding no higher than a third class medical certificate.

Watch the Goat

Your excellent article on the "Hazards of Self Fueling (July/August 1989) mentions the use of a chamois cloth, which I think needs clarification.

A chamois is a type of Swiss mountain goat, whose hide has been used for many generations as a strainer of liquids. For straining fuel it is certainly better than plastic, but I don't know how effectively it can be bonded. Watch out for synthetic look alikes, which are notorious static carriers! I would recommend instead one of the funnels now on the market with built-in screens or filters of fine mesh that will trap water as well as debris. These funnels are typically made of graphite which can be fully bonded to the nozzle and the airframe.

I know many pilots swear by the old chamois cloth, which has served us well over the years, but still it is a potential source of static charge. In any event, you can reduce that hazard by keeping the end of the hose nozzle or spout under the fuel level in the receptacle, if possible. Also, be careful to always place the rough side of the chamois up. (Otherwise loosened "fuzz" may end up in the engine fuel screen and cause fuel starvation.) Incidentally, a few years ago the Bureau of Mines produced a film on static electricity which actually showed droplets of **water** *creating enough charge to ignite a flammable fluid. It might still be available for pilot meetings.*

Tom Carter
Anchorage, AK

Refloating the Log

The March/April 1989 issue of FAA Aviation News *contained a letter about a pilot losing his logbook and asking about restructuring the lost information. I have a suggestion for all pilots—make a copy of the pages. This is an easy task for a new pilot, but if you have a large number of pilot logs, copies of the last page from each log showing the log total would be helpful. In this way, lost, stolen or destroyed logbooks could be recreated if necessary.*

J. Vincent Shuck
Wood Dale, IL

Another Suggestion

I believe the following could also help in resolving the data in the lost logbook:

1. Photocopy the records

2. If need be, have the individual documents notorized as true certified copies

3. File the copies off the premises from the originals.

Walter Dahlgren
Stamford, CT

FAA AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA AVIATION NEWS, AFS-20, Washington, DC 20591.

Direct Routing

I have used extensively, and promote in the LORAN-C atlas I publish, the use of LORAN-C not only in VFR flight but also for IFR. It is my understanding that as long as the LORAN is not installed in a manner that could interfere with other equipment, even if the LORAN is not IFR-approved it can still be legally used for filing and flying IFR direct. What do you say? This is a great saving of time and fuel.

Howie Keefe
Venice, CA

LORAN-C navigation equipment which is not FAA-approved for IFR conditions may not be used as the primary navigation system for filing and flying an IFR flight. Promoting such usage in a publication for pilots would be an irresponsible act.

• Emphasizing the Alternate

As a flight instructor it bothers me to see other instructors disregarding the regulations during training. A case in point is FAR §91.83 (a)(9) etc., which clearly states that an alternate airport need not be named on the IFR flight plan if there is a standard instrument approach at the first airport of intended landing; and the forecast for at least one hour before and one hour after ETA calls for a ceiling of 2,000 feet AGL and a visibility of at least three miles or better.

Why do some instructors insist on having trainees always include an alternate airport on the IFR flight plan?

Name withheld
Royal Oak, MI

Your statement concerning the requirements for filing an alternate airport [FAR §91.83 (a)(9) and FAR §91.83 (b)] is correct. We can only speculate on the reason some instructors require their instrument students to always file an alternate airport on all IFR flight plans. Some possibilities are:

1. Student practice in locating and selecting appropriate alternates.
2. Safety considerations in case of unforecast weather.
3. Flight school policy.

Remember, flights by instrument students on IFR flight plans must be dual flights. A non-instrument rated pilot is not allowed to fly as pilot in command under instrument flight rules, even in VFR conditions [FAR §61.3(e)].

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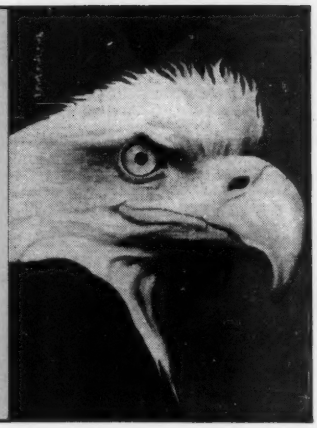


Storm-Proofing Your Airplane

continued from page 3

tied to prevent damage due to banging. Some aircraft have locks that operate from the cockpit; others use external locks. When using external locks, attach red streamers, connect a line to the tiedown anchor or use some other method to alert airport employees and pilots to remove the external locks before attempting to takeoff. Secure ailerons and rudders in neutral.

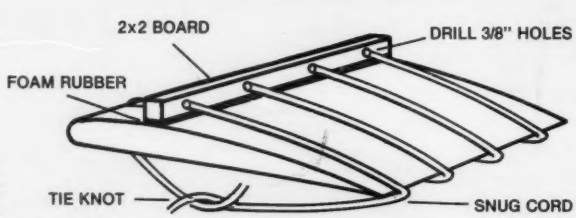
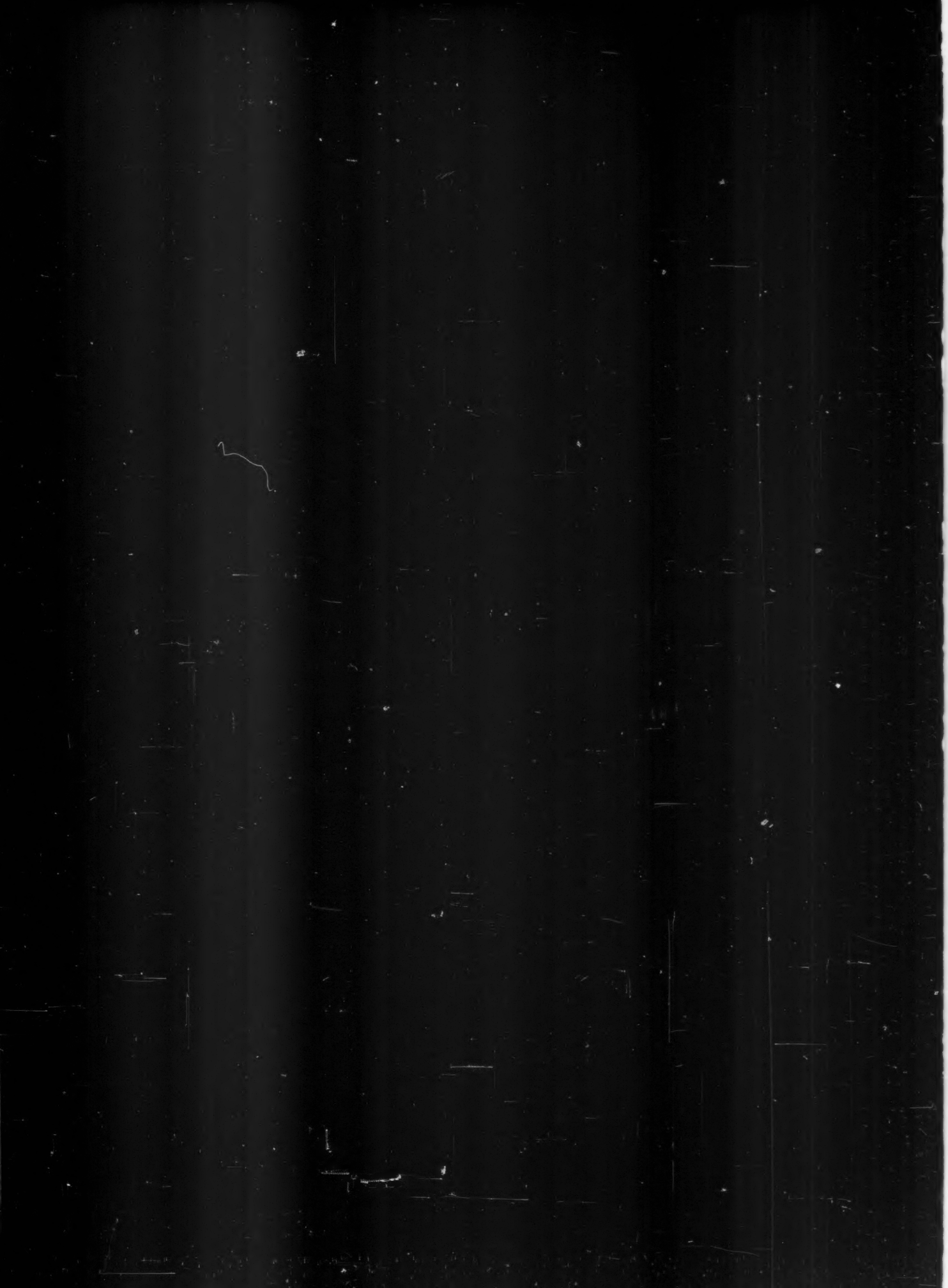
Tail wheel type aircraft headed into the wind should have their elevators set in the "up "position by securing the control column. If tailed into the wind, they should have their elevators fastened in the "down" position. Set and lock the wheel brakes.

On tricycle gear aircraft, run a tiedown line through the nosegear tiedown ring, if available. In addition, secure the middle of a length of rope to the tiedown ring in the tail section. Pull each end of the rope away at a 45 degree angle and fasten it to the ground anchors at each side of the tail. Next, tie down the wings using the tiedown rings. Elevators should be fastened parallel to the ground in a neutral position. Flaps should also be secured, especially if the airplane is tailed into the wind.

Chocks should be placed tightly in front of and behind each wheel. Nail a cleat to the chocks on each side of the wheel to keep them secure. Bricks and 2×4's are poor excuses for good chocks.

When a storm warning is received with enough time for you to get to the airport and secure your aircraft, there are a number of further precautions that can be taken. For example, a row of properly secured sandbags or 2×2 (or 2×4) "spoiler boards" set on the top of the wing's leading edge will reduce the wing's lifting tendency. Be careful that the sandbags do not overload the wings. A homemade spoiler board can be built by drilling a number of ⅜-inch holes across the length of the board and cementing a strip of 1-inch foam rubber to the bottom (nailheads could damage the surface of the wing). Thread nylon rope through the holes and, after wrapping around the wing, tie underneath after carefully protecting the wing surfaces from the rope with foam rubber, a piece of carpet, or even rags.

If an aircraft is outdoors and partially disassembled, particularly if the engine has been removed, it should be hangared if at all possible. Loose wings should be stored inside a hangar; never tie them against the fuselage.

FAA Advisory Circular "Tiedown Sense" (AC 20-35C) describes tiedown techniques and procedures for single engine aircraft and also provides information on tying down multi-engine aircraft, helicopters, seaplanes and aircraft with skis. It is available free from DOT, M-443.2, Washington, DC 20590. The illustrated circular gives additional details on many of the points described in this article. ■

TYPICAL HOMEMADE SPOILER BOARD